

Exploring tablet surrounding interaction spaces for medical imaging

Hanae Rateau
University Lille 1
CNRS (LIFL/IRCICA)
INRIA (Lille)
hanae.rateau@inria.fr

Laurent Grisoni
University Lille 1
CNRS (LIFL/IRCICA)
INRIA (Lille)
laurent.grisoni@lifl.fr

Bruno De Araujo
DGP lab, University of
Toronto
brar@dgp.toronto.edu

ABSTRACT

Medical imaging is essential to support most diagnosis. It often requires visualizing individual 2D slices from 3D volumetric datasets and switching between both representations. Combining an overview with a detailed view of the data [1] enables to keep the user in context when looking in detail at a slice. Given both their mobility and their adequacy to support direct manipulation, tablets are attractive devices to ease imaging analysis tasks. They have been successfully combined with tabletops [3], allowing new ways to explore volumetric data. However, while touch allows for a more direct manipulation, it suffers from the well-known fat finger problem which can interfere with the display, making it hard to understand subtle visual changes. To overcome this problem, we propose to explore the space around tablet devices. Such approach has been used for displays [2] to separate several workspaces of the desktop. Here, we use such space to *invoke commands* that are not required to be performed on the tablet, thus maximizing the visualization space during manipulations.

ACM Classification Keywords

H.5.2 User Interfaces: Input devices and strategies, Interaction Styles

Author Keywords

tactile interaction; spatialized interaction; mid-air gestures

INTERACTING AROUND THE TABLET

The core concept is to broaden the interaction with the tablet by using the space around it. We cut out this space into 8 areas denominated as slabs (see Figure 1). These 8 slabs can then be used as spaces for gestural interaction close to the device. Since the user is not required to use the tablet to interact with the displayed data, it opens new possible options to use these new inputs and control image attributes. For example, the

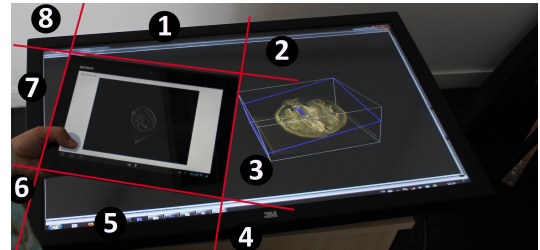


Figure 1. Slabs arrangement around the tablet and prototype setup.

right slab can be devoted to manipulating the detailed view on the tablet. The top slab could be used to interact with the distant overview. And the top right slab could be used as a view filter selector.

To illustrate such concept, we developed a simple prototype that uses the right slab of the tablet to allow the arbitrary slicing of a volume. The user sees the whole volume on a distant display and the tablet displays the slice. Here, we use the right slab of the tablet to determine the slice position and the tablet orientation gives the slice orientation.

FUTURE WORK

As future work, we would like to explore further functionalities to support medical imaging and assess the benefits of tablet surrounding interaction spaces through user studies. We think that using the surrounding space of the tablet would help the mental representation construction.

REFERENCES

1. D. Coffey, N. Malbraaten, T. B. Le, I. Borazjani, F. Sotiropoulos, A. Erdman, and D. F. Keefe. Interactive slice wim: Navigating and interrogating volume data sets using a multisurface, multitouch vr interface. *IEEE TVCG*, 18(10):1614–1626, Oct 2012.
2. D. Hausen, S. Boring, and S. Greenberg. The unadorned desk: Exploiting the physical space around a display as an input canvas. In *Proc. of Interact 2013*, Cape Town, South Africa, Sep 2013.
3. M. Spindler, W. Büschel, C. Winkler, and R. Dachsel. Tangible displays for the masses: spatial interaction with handheld displays by using consumer depth cameras. *Personal and Ubiquitous Computing*, 18 (5):1213–1225, Jun 2014.